systems that monitor input to, and consumption of output from, a generating device. These methods include coupling sensors to a controller of the generating device, and communication channels between the controller and a monitoring station via a telemetry module.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The foregoing features of the invention will be more readily understood by reference to the following detailed description, taken with reference to the accompanying drawings, in which:

[0012] FIG. **1** is a depiction of a monitoring system for distributed utilities in accordance with embodiments of the present invention; and

[0013] FIG. **2** is a depiction of a distribution system for utilities in accordance with embodiments of the present invention.

DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS

Monitoring

[0014] Referring first to FIG. **1**, preferred embodiments of the present invention provide for monitoring generation device **10**. Generation device **10** can be any distributed utility generation device, such as a water purification system, an electrical generator, or other utility generation device, or a combination of these. Generation device **10** may typically be characterized by a set of parameters that describe its current operating status and conditions. Such parameters may include, without limitation, its temperature, its input or output flux, etc., and may be subject to monitoring by means of sensors, as described in detail below.

[0015] In the case in which generation device **10** is a water purification device, source water enters the generation device **10** at inlet **22** and leaves the generation device at outlet **12**. The amount of source water **25** entering generation device **10** and the amount of purified water **13** leaving generation device **10** can be monitored through the use of one or more of a variety of sensors commonly used to determine flow rate, such as sensors for determining them temperature and pressure or a rotometer, located at inlet sensor module **21** and/or at outlet sensor module **11**, either on a per event or cumulative basis. Additionally, the proper functioning of the generation device **10** can be determined by measuring the turpidity, conductivity, and/or temperature at the outlet sensor module **11** and/or the inlet sensor module **21**. Other parameters, such as system usage time or power consumption, either per event or cumulatively, can also be determined. A sensor can be coupled to an alarm or shut off switch that may be triggered when the sensor detects a value outside a pre-programmed range.

[0016] When the location of the system is known, either through direct input of the system location or by the use of a GPS location detector, additional water quality tests may be run based on location, including checks for known local water contaminates, utilizing a variety of detectors, such as antibody chip detectors or cell-based detectors. The water quality sensors may detect an amount of contaminates in water. The sensors can be programmed to sound an alarm if the water quality value rises above a pre-programmed water quality value. The water quality value is the measured amount of contaminates in the water. Alternatively, a shut off switch may turn off the generation device if the water quality value rises about a pre-programmed water quality value.

[0017] Further, scale build-up in the generation device **10**, if any, can be determined by a variety of methods, including monitoring the heat transfer properties of the system or measuring the flow impedance. A variety of other sensors may be used to monitor a variety of other system parameters.

[0018] In the case in which generation device **10** is an electrical generator, either alone or in combination with a water purification device or other device, fuel enters the generation device from a tank, pipe, or other means through fuel inlet **24**. The amount of fuel consumed by generation device **10** can be determined through the use of a fuel sensor **23**, such as a flow sensor. Electricity generated, or in the case of a combined electrical generator and water purification device, excess electricity generated can be accessed through electricity outlet **15**. The amount of electricity used, either per event of cumulatively, may be determined by outlet sensor module **14**. A variety of other sensors may be used to monitor a variety of other system parameters.

[0019] In either of the cases described above, input sensor modules **21** and **23** as well as output sensor modules **11** and **14** may be coupled to a controller **100**, electrically or otherwise, in order to process, concatenate, store, or communicate the output values of the respective sensor modules as now described in the following section.

Communications

[0020] The sensors described above may be used to monitor and/or record the various parameters described above onboard the generation device **10**, or in an alternative embodiment of the present invention, the generation device **10** may be equipped with a communication system **17**, such as a cellular communication system. The communication system **17** could be an internal system used solely for communication between the generation device **10** and the monitoring station **20**. Alternatively, the communication system **17** could be a cellular communication system that includes a cellular telephone for general communication through a cellular satellite system **19**. The communication system **17** may also employ wireless technology such as the Bluetooth® open specification. The communication system **17** may additionally include a GPS (Global Positioning System) locator.

[0021] Communication system **17** enables a variety of improvements to the generation device **10**, by enabling communication with a monitoring station **20**. For example, the monitoring station **20** may monitor the location of the generation device **10** to ensure that use in an intended location by an intended user. Additionally, the monitoring station **20** may monitor the amount of water and/or electricity produced, which may allow the calculation of usage charges. Additionally, the determination of the amount of water and/or electricity produced during a certain period or the cumulative hours of usage during a certain period, allows for the calculation of a preventative maintenance schedule. If it is determined that a maintenance call is required, either by the calculation of usage or by the output of any of the sensors used to determine water quality, the monitoring station **20** can arrange for a maintenance visit. In the case that a GPS (Global Positioning System) locator is in use, monitoring station **20** can determine the precise location of the generation device **10** to better facilitate a maintenance visit. The monitoring station **20** can also determine which